

REPORT: IDA17667

ANALYSIS OF ORIGINAL STONE AND IDENTIFICATION OF MATCHING STONE FOR REPAIRS: ROBERT BURNS STATUE, CAMPERDOWN, VICTORIA, AUSTRALIA



Burns Statue, Camperdown, Victoria, Australia

Plaque reads: "Burns, from an original painting by his friend, Peter Taylor, Edinburgh, 1786.

By John Greenshields, sculptor, Edinburgh, 1830. Presented to the public park by W.A. Taylor, Esq. Camperdown, 1883."

Image from 'The Standard' 25/05/2009 "*Wee row erupts over old Robbie: Town resists call to remove statue*"

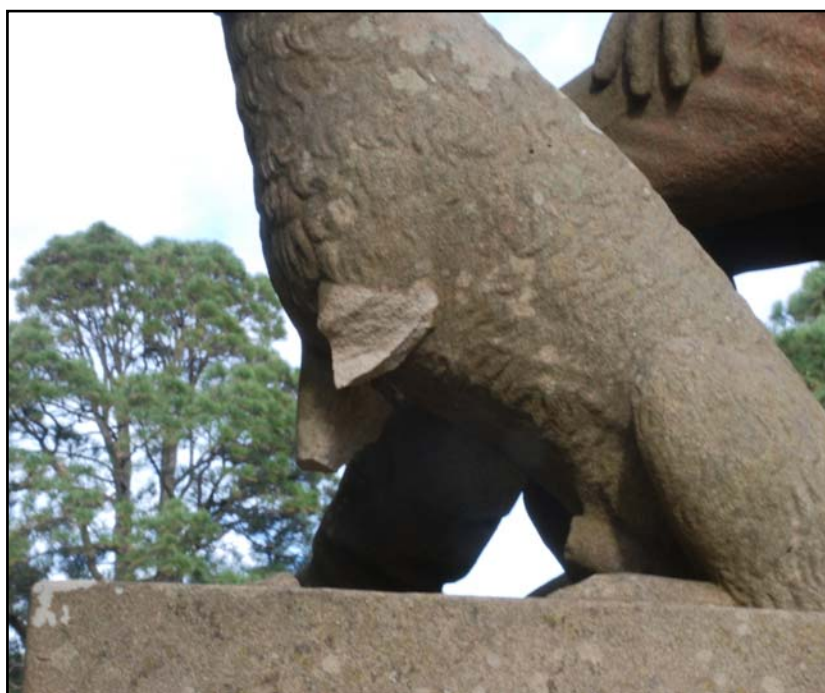
SUMMARY

The Burns statue in Camperdown Australia is one of the oldest surviving representations of Robert Burns. It was taken from Scotland to Australia in 1882 where it has been on display in a public park for over 125 years. The statue was repaired a number of years ago, and recent vandalism has meant the statue now requires further stone repairs. Samples of both the original and a possible replacement stone (Sydney yellow block sandstone) were sent for analysis. The original stone in the statue is a sandstone typical of west-central Scotland and it is recommended that a stone of this type is used for the repairs. The Sydney yellow block sandstone has different mineral and textural characteristics and is less suitable as a replacement stone.

Today there are no building stone quarries in west-central Scotland and almost all sandstone for repairs and new construction is imported from northern England. The stone in the statue is very similar to sandstone from Drumhead quarry near Falkirk, and this site is currently being investigated by the Scottish Stone Liaison Group for reopening. It is recommended that stone from Drumhead quarry is used for the repairs to the statue. Alternative similar sandstones from northern England are also suggested.

1. INTRODUCTION AND BACKGROUND

BGS was asked by James McAuley of Cathedral Stone, Victoria, Australia to examine a stone sample from the above statue following vandalism (see Appendices 1 & 2). The aim of this report is to identify the original stone type in the statue and suggest appropriate stone for forthcoming repair works. In addition, a sample of ‘Sydney yellow block’ sandstone was provided in order to assess the compatibility of this stone and its suitability for use in the repairs.



Recent damage to Robert Burns' dog "Luath" before the statue's removal from Camperdown Botanic Gardens. Image supplied by James McAuley of Cathedral Stone, Victoria, Australia.

One small, representative sample of the original stone was sent to the BGS, Edinburgh, Scotland, obtained from an already damaged part of the statue. The second sample provided was an Australian sandstone known as ‘Sydney yellow block’ from Pymont, Sydney, understood to be a possible candidate for the repairs.

Sample ED10558-A: Small chip sample of the original stone. Beige coloured, fine to medium grained, uniform sandstone. Stronger greyish brown colour where weathered on the surface. Dimensions: c.50 x 40 x 20mm.

Sample ED10558-B: Small sample of ‘Sydney yellow block’ sandstone. Yellow coloured, fine to coarse grained, uniform. Orange-red coloured where weathered on the surface. Dimensions: c.55 x 30 x 20mm.

2. HISTORICAL EVIDENCE RELATING TO THE STATUE

John Greenshields' statue of Robert Burns was commissioned by William Taylor of Leith, Edinburgh between 1826 and 1830. It is thought to be the only statue based on the portrait of Burns painted by the amateur artist Peter Taylor in 1786 when Burns was 27 years old (see image). Taylor's portrait is thought to be the only painting of Burns completed with the poet present. William Taylor's son, W.A. Taylor, emigrated to Victoria in 1876, and later married an Australian and returned to collecting his belongings from Scotland in 1882, including the bequeathed statue. The statue was donated a year later to Camperdown's Public Park and has remained in this spot for over 125 years. Previous repairs have been made to the statue, although the stone type used is not known. Following recent vandalism, the statue has been removed for safe keeping prior to repairs and possible re-siting.

Robert Burns steel plate engraving by John Horsburgh (first published in 1830) from the original portrait by Peter Taylor c.1786. Peter Taylor was a house and coach painter in Edinburgh and a friend of Burns. If the original painting's authenticity is accepted, it is the earliest likeness made of Robert Burns.



According to 'Dictionary of British Sculptors' (Gunnis 1953), Greenshields was born in Lesmahagow in Scotland in 1792 and became an apprentice stonemason in nearby Crossford. By 1822 he was employed by fellow sculptor Robert Forrest, and eventually set up his own studio at Milton, near Carlisle. The latest studio that Greenshields was known to work from was at Broomhill on the estate of Robert Lockhart Esq. of Cambusnethan—possibly the studio frequented by Sir Walter Scott in 1829 and 1831.

Other known works by Greenshields include: 'Heraldic Escutcheon' in the pediment of Hamilton Palace (c.1822 dem. 1928); 'James Watt' (c.1824), originally at Mechanics Institute, Bath Street, Glasgow, currently at Strathclyde University's Royal College Building; 'Lord Byron' (c.1825); 'George Canning' (c.1827); 'Duke of York' (c.1828); 'King George IV' (c.1829), resulting in a visit by Sir Walter Scott that year to commission further works; 'Statue for Mr. Cadell' (c.1835),

commissioned by Sir Walter Scott; ‘Highlander’ (c.1835) on the Jacobite Monument, Glenfinnan; ‘Sic Sedebat’ (unknown date), ‘statue of Sir Walter Scott’ in Parliament House, Edinburgh; Marble bust of Scott (unknown date), at Abbotsford House; ‘The Jolly Beggars’ (c.1835); ‘Sir Walter Scott Monument’ (c. 1834-8), George Square, Glasgow finished by John Ritchie and William Mossman.

Leighton’s ‘Select views on the river Clyde’ (1830) refers to the stone type used for Greenshields’ Duke of York statue (carved the same year as the Burns statue), stating that the stone was sourced from a quarry on the Lockhart estate where Greenshields’ workshop was located: “The stone....is of great beauty, and nearly as white as marble... and is perfectly free, notwithstanding the great size of the block, from any spot or mark whatever. It is from a quarry on the estate of Robert Lockhart Esq of Cambusnethan, who gave it free of charge to the artist”. It seems possible that the same stone sourced to carve the Duke of York could have been used for the Burns Statue, although it has not been possible to verify this within the scope of the present study.

Some historical sources have suggested that Caen stone was used for the Burns Statue. For example, a letter published in the Melbourne newspaper ‘The Age’ in 1885 concerning the erection of the statue in Camperdown states: “The beautiful public park near the township contains a full size statue of the immortal bard. The work, which is executed in Caen stone, represented the poet seated on a stump of a tree, whilst by his side is the bard’s celebrated dog, Luath”.

Caen stone is a distinctive pale yellow Jurassic Limestone quarried in Normandy, France. Although Caen Stone may have been used by Greenshields for other works (note: none of these have been examined as part of this study), this report clearly shows that the stone in the Burns statue in Camperdown is definitely not Caen Stone and is almost certainly a sandstone from West Central Scotland. This is consistent with the area where Greenshields appears to have lived and worked.

3. ANALYSIS OF SAMPLES

3.1 Original stone in the statue (ED10558-A).

Macroscopic Description

Mostly 'fine' and 'fine to medium' grained sandstone with abundant crystalline quartz grains. Uniform pale beige colour and uniform texture, although sample is too small to be certain of the uniformity of the whole stone. Almost a freestone, bedding is only marked by well oriented flakes of muscovite (white mica). Ochre-coloured iron oxides/hydroxides appear altered and mobilized, which gives the colour to the stone. The stone is rather dense, with pores infilled with some white, powdery clays or carbonate. Occasional black grains of possible organic matter or solid iron oxides/hydroxides. Strong reaction to 10% HCl indicating presence of carbonates, possibly calcite. Absorption to a water bead test shows moderate permeability.

Munsell colour code for the freshest part of the sample is between 2.5Y 8/2 and 7/3; *greyish yellow*. The most external part is covered in a light patina of soiling of a darker greyish brown colour, c.2.5Y 6/3; *greyish yellow*, but this does not appear to affect the stone underneath. The sample appears hard and competent.



Weathered external surface of the sample of original stone from the Burns statue. The orange-brown colour of the surface is due to alteration of iron and carbonate minerals in the sandstone.



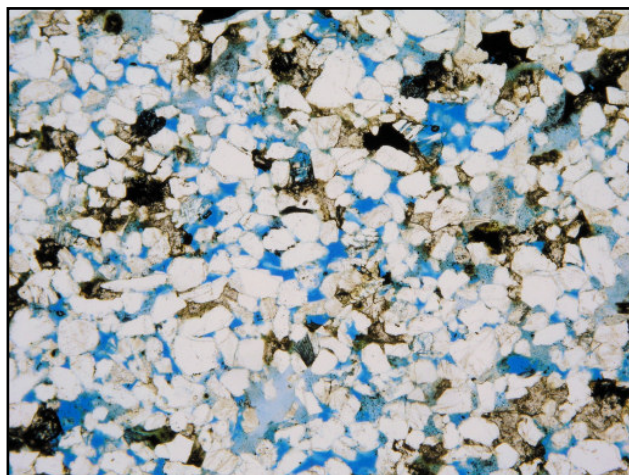
Internal broken surface of the sample of original stone from the Burns statue showing the pale appearance of the fresh sandstone. The slightly speckled orange appearance is caused by weathering of iron and carbonate minerals.

Microscopic Description

Mostly 'fine' to occasionally 'medium' grained sandstone. Grains range from 0.1 mm to 0.6 mm, mostly 0.2-0.25 mm and rather well sorted. Quartz grains (estimated c.75% of the stone) are clean and fresh, angular to rounded mostly monocrystalline. A small amount of feldspars (c.4-5%) and lithic grains (c.1-2%, of possible metamorphic origin) appear generally fresh, with a small percentage altered to clays. Iron oxide is estimated at c.2-3%, appearing as scattered mobilized grains. White mica (muscovite) is present as medium to long crushed flakes, comprising c.1% of the sandstone. Minor biotite mica, altered to chlorite.

Matrix minerals consist of clay minerals and carbonates comprise c.15% infilling some pore spaces with a fairly homogeneous distribution. Clays are both primary as well as secondary, as a product of the weathering of some of the feldspars. Carbonates are commonly associated with iron oxides, as well as occurring as 'clean' patches of sparry crystals of probable calcite. The stone is classified as an impure **quartz arenite sandstone**, nearly a **quartz wacke**.

The sandstone has a uniform texture with a moderate to well communicated porosity (c.14-15% of the total of the stone). The contacts between the grains are punctual, long and pressure-solution, making this a relatively well compacted stone and grains are cemented by some moderately-developed silica cement overgrowth.



Microscopic images of the original stone from the Burns statue showing uniform grainsize and texture, dominated by quartz grains (white) with irregular carbonate (grey-brown) and iron oxide (black). Image is plane polarised light. Porosity is highlighted by blue dye resin. Images are c.3.3mm across.

3.2 Analysis of possible replacement stone: 'Sydney yellow block' sandstone (ED10511-B)

Macroscopic Description

Uniform, 'fine' to 'coarse' grained, poorly sorted sandstone. Yellowish colour, with a speckled appearance caused by small brown iron oxide/hydroxide grains. Fairly tight and uniform texture with no apparent bedding (freestone) with visible clays. Although there are flakes of muscovite (white mica), these do not have any strong preferential orientation. Munsell colour code is between 5Y 8/2 to 7/2; *greyish yellow*. No reaction to 10% HCl indicating either lack of carbonates or some dolomite/siderite carbonate. Absorption to a water bead test is low, indicating moderate to low permeability.

Munsell colour code for the freshest part of the sample is between 2.5Y 8/2 and 7/3; *greyish yellow*. The external part of the sample is a stronger reddish colour (c.2.5YR 6/3 to 5/3; *pinkish beige to greyish brown*) which has penetrated the stone to a depth of 2-3 mm. This outer layer is slightly softer than the underlying fresher stone, but overall the sample appears moderately competent. The history of this particular sample is not known, so the reason for the altered external surface to the sample (e.g. natural weathering or artificial surface colouring) cannot be ascertained.



External surface of sample of 'Sydney yellow block'. The reason for the strong red-brown colouring of the external surface is not known.



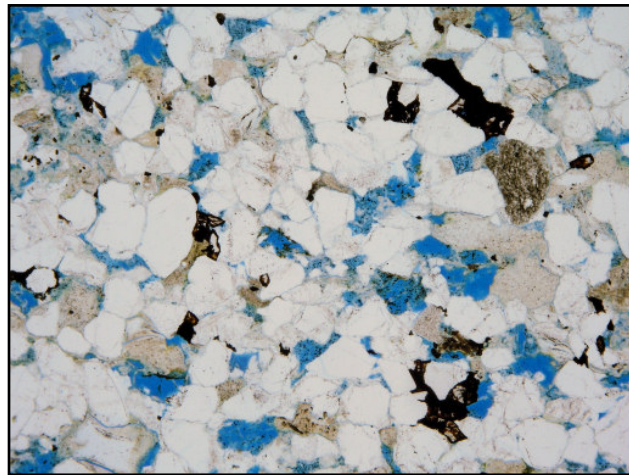
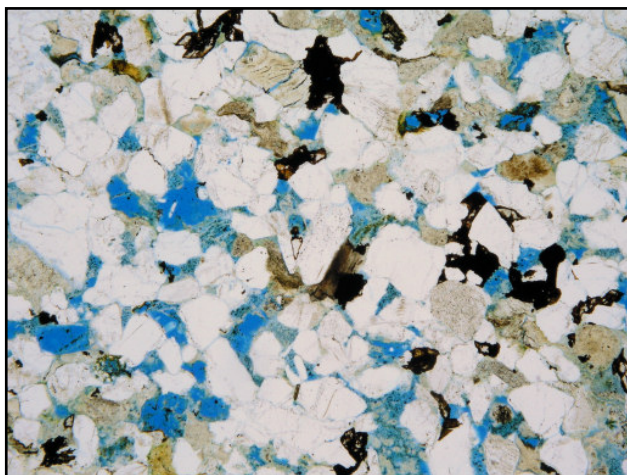
Internal broken surface of 'Sydney Yellow block' stone, showing the pale colour of the fresh stone.

Microscopic Description

Uniform freestone sandstone, moderately to poorly sorted with framework grains ranging from 0.1 mm to 1.2 mm, mostly c.0.35-0.5 mm (medium grained), angular to subrounded. Composed of an estimated c.65% quartz. Quartz grains appear often with undulating extinction and mostly monocrystalline, occasionally containing rutile needles as inclusions. Occasional fresh lithic grains (of possible metamorphic origin), comprises c.1-2% of the stone. Both lithic grains and feldspars appear strongly altered into clays beyond possible identification. Minor white mica (muscovite) is present as small, broken flakes, comprising c.1% of the sandstone, moderately to poorly oriented. Iron oxide is estimated at c.4%, appearing as mobilized grains of various sizes, from fine to coarse, often associated to carbonates.

Matrix minerals are abundant, c.20-25%. Clay minerals are common comprising c.20%, locally infilling pore spaces as complex associations of different clay minerals. Some appear primary although much secondary clays are derived from the weathering of feldspars (and possibly of lithic grains). Carbonates (siderite?) comprise c.3-4%. Moderately large, well rounded zircon/monazite is present as an accessory phase. The relatively low percentage of quartz and the high percentage of matrix minerals, as well as the scarcity of fresh feldspar and rock fragments (lithic grains) mean this stone is classified as a **quartz wacke sandstone** towards a **feldspathic wacke/lithic wacke**.

The sandstone has a uniform texture with moderate to high porosity (estimated c.12-16% of the total of the stone), moderately communicated. The contacts between the grains cover the range from punctual, long, pressure-solution and some also interlocked, indicating a fairly well compacted stone. The grains are moderately cemented by an irregular, occasionally thick layer of secondary silica cement overgrowth.

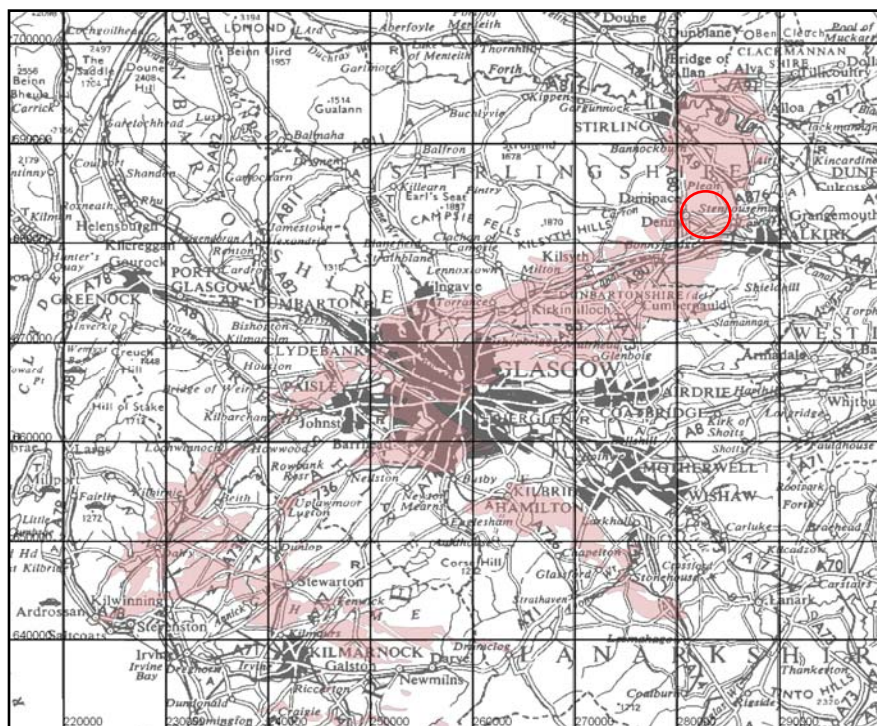


Microscopic images of 'Sydney yellow block' sandstone. Compared to the original stone in the statue, it has a coarser and more variable grainsize with more abundant clay minerals within the pore spaces (irregularly formed grey minerals scattered throughout). Images are plane polarised light. Porosity highlighted in blue dye resin. Images are c.3.3mm wide.

4. ORIGIN OF THE ORIGINAL SANDSTONE IN THE STATUE

The historical evidence indicates that the sculptor John Greenshields, was based and operated mostly in the Central Belt of Scotland (see Appendix 3). The petrographic analysis of the original sample from the Burns statue indicates that the stone is typical of sandstone from this area. Specifically it shares characteristics with sandstone from the Clackmannan Group (Upper Limestone Formation) rocks of Carboniferous age that extend across a large part of West Central Scotland. In particular the sample is similar to specimens of sandstone from the BGS collections that belong to the “Cowie Rock” which outcrops in the Stirling/Falkirk area. Cowie Rock was highly reputed as a building stone and quarried at a number of sites such as Polmaise, Thorneydyke, Drumhead, Dunmore; and similar to other well known Scottish sandstones quarried near Glasgow such as Giffnock and Bishopbriggs/Huntershill. This sandstone was used for many well-known buildings in Glasgow, Edinburgh and Stirling and throughout the Scottish Central Belt. Whilst the precise quarry origin of the stone in the Burns Statue is not known, it bears a strong resemblance to samples from Thorneydyke quarry, near Denny. Today, Thorneydyke quarry is completely infilled with waste and the stone resource has been lost.

There are no building stone quarries currently active in West Central Scotland, although one quarry in the Cowie Rock (Drumhead quarry near Denny) is currently under investigation for reopening. Drumhead quarry is situated c.500 metres south of Thorneydyke and sandstone from the two quarries is similar.



Map of part of West Central Scotland showing the area of outcrop of the Clackmannan Group (pink colour) where the stone for the Burns Statue is likely to have its origin. The location of Thorneydyke and Drumhead quarries, the closest matching stone to the original, is shown by a red circle. There are no active building stone quarries in the region today.

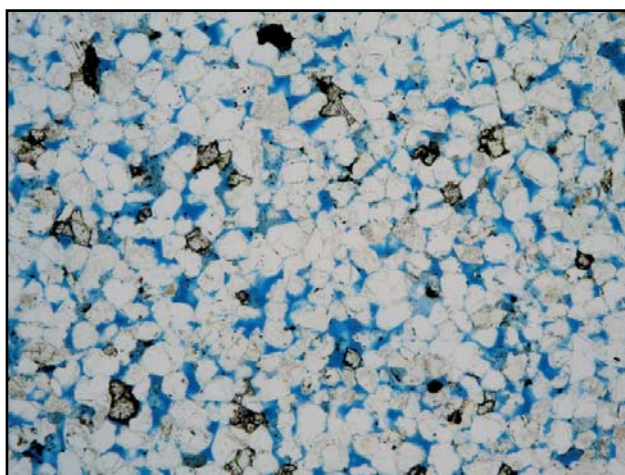
5. IDENTIFICATION OF CURRENTLY AVAILABLE MATCHING STONE FOR REPAIRS

None of the original quarries in Scotland producing sandstone of this type are active today. The sample from the statue was compared to specimens of currently-available sandstone from our database of UK quarries. One Scottish quarry, Drumhead, is in the process of reopening and contains sandstone with similar characteristics to the original stone type. A number of quarries in Northern England currently produce reasonably sandstone with reasonably similar composition and texture, although typically have a slightly stronger orange-brown colour.

The sandstone types with closest visual (i.e. colour, general appearance and macroscopic texture) and petrographic (i.e. composition, microscopic texture, porosity etc.) characteristics are listed below, in order of similarity to the original. These should provide compatible matching stone for repairs. We suggest that samples of these stone types are obtained for on-site visual comparison prior to stone specification. Contact details for these stone types are given at the end of this report.

5.1 Sandstone from Scotland

Drumhead sandstone: Moderately to well sorted, fine to medium grained sandstone. Quartz-rich with similar composition to the Burns statue sample, although colour can be slightly paler due to less carbonates and iron oxides. This stone ranges between a white coloured stone with uniform texture and a beige coloured, slightly laminated stone. The more uniform variety should be selected as lamination is not desirable for carved work. Moderately to well cemented stone. Similar porosity and permeability. Image is c.3.3mm across; plane polarised light. Porosity is highlighted in blue dye resin.



Microscopic image of sandstone from Drumhead quarry. The stone has a very similar uniform grain size and porosity to the original stone in the Burns statue, though with less carbonate (darker grey-yellow grains). The presence of carbonate is generally considered undesirable in sandstones for building/sculptural use. Image c.3.3mm wide; plane polarised light; porosity highlighted by blue dye resin.

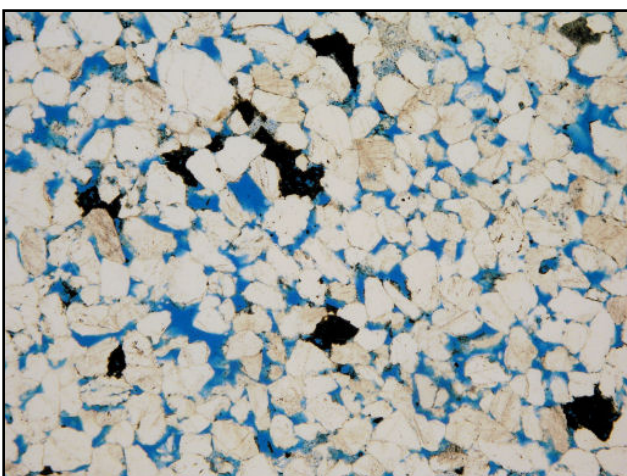
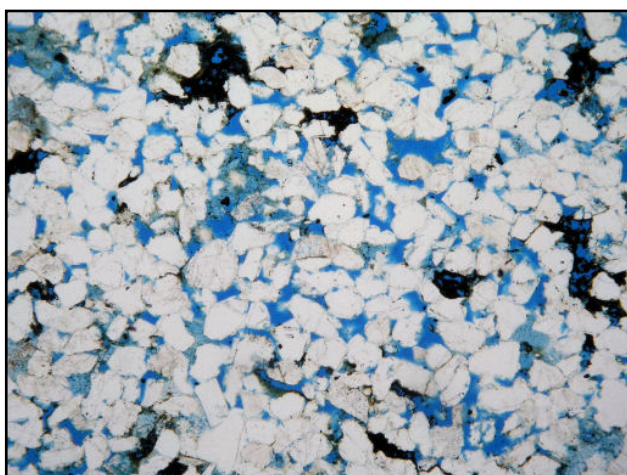


Natural surface of specimen of sandstone from Drumhead quarry near Denny. This quarry is from the 'Cowie Rock' – the likely source of the original stone used in Burns statue. Today no building stone quarries are active in this part of Scotland, although Drumhead quarry is in the process of reopening. The specimen shows very similar characteristics to the original stone in the statue.

5.2 Alternative sandstones from Northern England

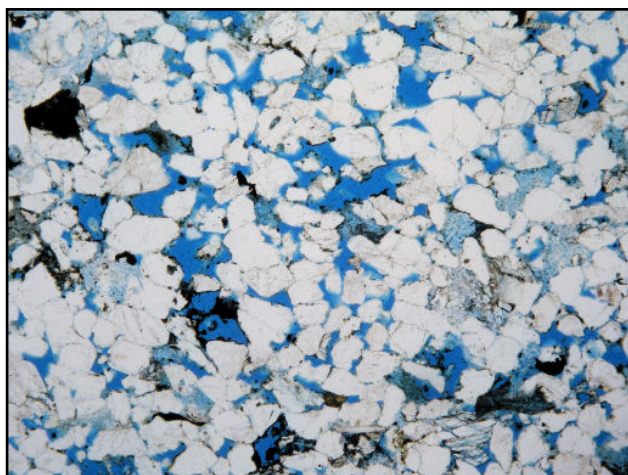
Today, almost all the sandstone used for both repairs and new build in Scotland is imported from Northern England. Examination of specimens from active quarries held in our database has identified the following stone types as having broadly similar characteristics to the stone in the Burns statue:

Dunhouse Buff/Cragg: Moderately sorted, fine to medium grained sandstones (slightly coarser than the sample from Burns Statue, particularly Cragg), with fairly uniform texture (both are freestones) and quartz-rich composition. Rather similar composition, but slightly more beige colour, more similar to the colour of the weathered stone. Small percentages of iron oxides and clay minerals are present, as well as muscovite flakes, but no carbonates. Moderately cemented stones, with similar porosity and permeability. Images are c. 3.3mm across; plane polarised light. Porosity is highlighted in blue dye resin.



Microscopic images of Dunhouse Buff (top) and Cragg (bottom) sandstones, with their macroscopic samples to the right. These stone types have similar overall composition and texture to the original stone in the Burns statue, though with more variable grainsize and slightly more iron oxide content (black grains). The presence of iron gives these stones a slightly stronger orange-brown colour. No carbonate is present. Images c.3.3mm wide; plane polarised light; porosity highlighted by blue dye resin.

Blaxter: This sandstone has a similar overall composition to the sample from Burns Statue, though with slightly coarser and more variable grainsize. The presence of iron oxides (black in image) give it a slightly stronger orange colour. Image is c.3mm across; plane polarised light. Porosity is highlighted in blue dye resin.



Microscopic image of Blaxter sandstone (left) showing slightly coarser and more variable grainsize compared to the sample from Burns statue. No carbonate is present. Image c.3.3mm wide; plane polarised light; porosity highlighted by blue dye resin. Macroscopic sample of Blaxter sandstone to the right, with a stronger beige colour.

6. SUMMARY AND DISCUSSION

A stone sample from the Burns statue in Camperdown, Australia was received for analysis, along with a sample of ‘Sidney yellow block’ stone, understood to be under consideration for use in forthcoming repairs.

The original stone is a pale coloured quartz-rich sandstone with a uniform texture and minor iron oxide and carbonate. It has characteristics typical of sandstones of Carboniferous age that were extensively quarried in Central Scotland during the 19th century. Specifically, the sample shows similarities to stone the Clackmannan Group rock of West Central Scotland, which yielded well-known sandstones of high reputation such as the “Cowie Rock” from Falkirk and Stirlingshire and Giffnock stone from Glasgow.

Historical evidence shows that the sculptor, John Greenshields, lived and worked in West Central Scotland, supporting this as the area from what the original stone was sourced. Whilst in the mid-19th



Comparison of sample of the original sandstone from the Burns statue (left) and a specimen from Drumhead quarry, near Denny (right) showing virtually identical colour and texture.

century there were approximately 700 registered sandstone quarries operating in Scotland, today there are only about 6 quarries supplying stone. There are no active quarries in West Central Scotland, nor any supplying identical sandstone to that in the statue. One quarry (Drumhead near Denny) is currently undergoing investigations for reopening. Drumhead sandstone is a close match to the original stone from the Burns statue and would provide the most appropriate matching stone for repairs.

Almost all sandstone currently used in Scotland (for repairs and new-build) is imported from northern England. A number of sandstone types from active quarries have been identified which have broadly similar characteristics and may also be suitable for repairs. These are Dunhouse Buff sandstone, Cragg sandstone and Blaxter sandstone.

Examination of the sample of 'Sydney yellow block' shows that it has significantly different characteristics and is not a good petrographic match to the original stone in the statue. All of the replacement stone types suggested above are more similar in terms of texture (grainsize, porosity characteristics) and mineral composition than the 'Sydney yellow block'.

Recent research into the performance of replacement sandstone has shown that the use of indents of different sandstone types (i.e. with different petrological characteristics) can lead to damage of the original stone (e.g. Hyslop 2004: Historic Scotland Research Report '*Performance of replacement sandstone in the New Town of Edinburgh*'). This can be due to several factors, most importantly differences in porosity/permeability characteristics that can result in moisture being forced into the original stone if it is more permeable. It is recommended that a replacement stone that is as close as possible to the original in terms of petrological characteristics should always be used to ensure long term compatibility. This will also ensure that the replacement stone will weather in a similar way to the original.

In summary, we recommend that the forthcoming repairs are carried out using a sandstone with very similar petrological characteristics to the original. Because the original stone in the statue appears to have been sourced from West Central Scotland we recommend that a sandstone from this area is used for the repairs. Although all the original quarries have closed, it may be possible to obtain stone from **Drumhead quarry** which is in the process of reopening. The nearest similar alternatives are from quarries on Northern England (**Dunhouse Buff, Cragg and Blaxter**).

We recommend that samples of the recommended stone types are obtained for on-site visual comparison prior to stone specification. Contact details for these stone types are given at the end of this report. Please note that the characteristics of stone from a quarry source can vary over time, and that the recommendations in this report are based on comparison with samples held in our collections. Whilst the analysis undertaken in this report complies with BS EN 12407:2000, the mention of specific stone types should not be taken as an endorsement, or otherwise, of the quality of a particular product. Specific functional requirements, block dimensions and the ability of a stone to give a particular masonry finish should be discussed with the supplier prior to specification.



Report: _____

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Petrographic analysis: _____

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Emily Tracey

Date: 16/09/2009

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CONTACTS FOR CURRENTLY AVAILABLE SANDSTONES:

Drumhead sandstone

Note that this quarry is in the process of reopening. Nevertheless may be possible to obtain relatively small quantities of stone.

CONTACT: Scottish Stone Liaison Group (Colin Tennant)
16 Rocks Road, Charlestown, Dunfermline, Scotland KY11 3EN.
Tel. +44 (0) 1383 872006
colin.tennant@sslgroup.co.uk

Blaxter

Dunhouse Buff

Dunhouse Quarry Ltd.
Darlington, County Durham, England
General Enquiries +44 (0) 1833 660 208
Contract Sales Office +44 (0) 1833 660 999

Cragg

Tynedale Natural Stone Ltd.
Davison House, Rennys Lane, Dragonville Industrial Estate, Durham, England DH1 2RS
Email: enquiries@mglgroup.co.uk
www.tynedalenaturalstone.co.uk

7. INFORMATION & LIMITATIONS OF THIS REPORT

The Building Stone Assessments GeoReport provides a detailed petrographic description of the sample or samples taken from the buildings or structures in accordance with British Standard BS EN 12407:2000 (Natural Stone Test Methods – Petrographic Examination). Stone type is defined in accordance with European Standard prEN 12670:1997. Where possible the source or sources of the original stone are identified.

The aim of this report is to provide recommendations for the closest matching stone type for repairs, to ensure long term compatibility with the original masonry. Petrographic analysis defines the stone in terms of factors such as mineral composition, texture and porosity characteristics, to enable a replacement stone type of similar performance to be selected.

This report is designed for use by professionals involved in building repair and/or conservation but it might also be useful for private individuals to help them judge whether or not further professional advice should be sought. We recommend that members of the public consult a qualified professional about the results in this report before making any major decisions based on it.

This report is based on analysis of the sample or samples provided and cannot be assumed to be representative of all materials in a building or structure unless an on-site assessment has been carried out by a qualified professional.

Please note that a recommendation of a replacement stone does not constitute a repair specification. All aspects of the building (location, detailing, other materials) must be considered in competent repair work.

The report provides a petrographic examination of stone type. This does not guarantee that a replacement stone is suitable for a particular purpose (e.g. carved detail), nor does it guarantee specific properties of a stone such as strength. Aspects such as bed height, block size etc. will have to be discussed with the supplier.

Recommendations for replacement stone are based on and limited to an interpretation of the records in the possession of The British Geological Survey (BGS) at the time the examination is carried out.

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Methodology: The samples were gently washed with water and examined using a binocular microscope (Bausch & Lomb). Colour was determined using a standard Munsell® Colour Rock Chart (Geological Society of America). The samples underwent thin sectioning at the BGS thin section laboratory, impregnated with blue dye resin in order to highlight porosity. The section is supplied on a glass slide measuring 75 by 25mm. The thin sections were chosen to be as representative of the stone sample as possible, cut perpendicular to fabric and contains, where appropriate, the external surface. They were examined using a petrological microscope (Zeiss Standard WL polarizing microscope) following the procedures given in BS EN 12407:2000 ‘Natural Stone Test Methods – Petrographic Examination’.



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APPENDIX 1: From 'The Standard' May 25, 2009

Wee row erupts over old Robbie: Town resists call to remove statue

THE STANDARD
BY JARED LYNCH
25/05/2009 4:00:00 AM



CAMPERDOWN residents are fighting to keep its historic but decaying Robert Burns statue.

The sculpture of Scotland's revered poet, commissioned in 1830, is believed to be the oldest in Australia and a former Liberal MP wants it shifted to Melbourne so it can be preserved.

But Corangamite Shire mayor Ruth Gstrein scoffed at suggestions the statue should be moved to the big smoke. And she's not alone.

Polwarth MP Terry Mulder said the statue was one of Camperdown's icons and should be kept in the town.

"It should be restored in Camperdown and could be a

tourist attraction during that process," he said.

Burns enthusiast and former Victorian Liberal MP, Gordon Ashley, dated the statue, which stands in Camperdown's botanical gardens, at nearly 180 years old.

Mr Mulder said his former colleague hoped to shift it to Melbourne so the structure could be better preserved.

The noses on both Burns and his dog have been removed and part of the poet's hat is missing.

But Cr Gstrein said while the monument was of state significance, Camperdown was just as much a part of Victoria as Melbourne.

She said the statue had been damaged by vandals on several occasions over the years and the council would soon build a fence to better protect it.

"It's very, very old and it needs to be repaired," Cr Gstrein said.

The mayor said rather than shipping the statue back to Scotland for repairs, it would be more appropriate to source similar Scottish stone and engage an expert Australian stonemason to carry out the work.

The life-size statue was commission about 1830 in Scotland by William Taylor. His son brought the statue to Australia in 1882 and donated it to the Camperdown gardens in 1883.

APPENDIX 2: From 'The Times' June 5, 2009

Vandalised monument found in Australia may be oldest Robert Burns statue

Melanie Reid



The nose is broken off, the eye socket damaged and parts of the hat brim missing. But this battered monument, newly discovered in an obscure part of Australia, is believed to be the oldest surviving statue of Robert Burns. The race is now on to save the decaying work, which was carved about 30 years after the poet died in 1796 and shipped to Australia in the 1850s by a wealthy Scot.

For more than 150 years the statue has occupied a small corner of the botanical gardens in Camperdown, a small town in rural Victoria, its true value and historical worth forgotten — until a chance discovery by an Australian writer and historian during a research trip to Scotland.

Gordon Ashley said that the statue was carved by the Scots sculptor John Greenshields in 1826-27 and may be the only one based on a portrait of Burns by Burns's friend Peter Taylor, an amateur artist. All other statues were based on a likeness by the painter Alexander Nasmyth. Mr Ashley is fighting to save the statue, which has suffered from weather, age and vandalism, and as a result of his efforts, the National Trust of Australia last week removed it from the gardens for safe-keeping. He has also appealed to the Scottish government for help to bring it back to Scotland for restoration.

Mr Ashley, 68, said that the statue was priceless. "It should be regarded as the primary icon, not just because it was the first done of Burns, but because 'photographically', if nothing else, it is superior to that produced by Alexander Nasmyth, the professional artist," he said.

Mr Ashley became interested in the statue after coming across a reference to a Greenshields carving thought to have been taken to Australia in the 1850s in documents at the Burns Birthplace Museum in Alloway. "I knew if that statue was still 'alive', I had the makings of wonderful story," he said.

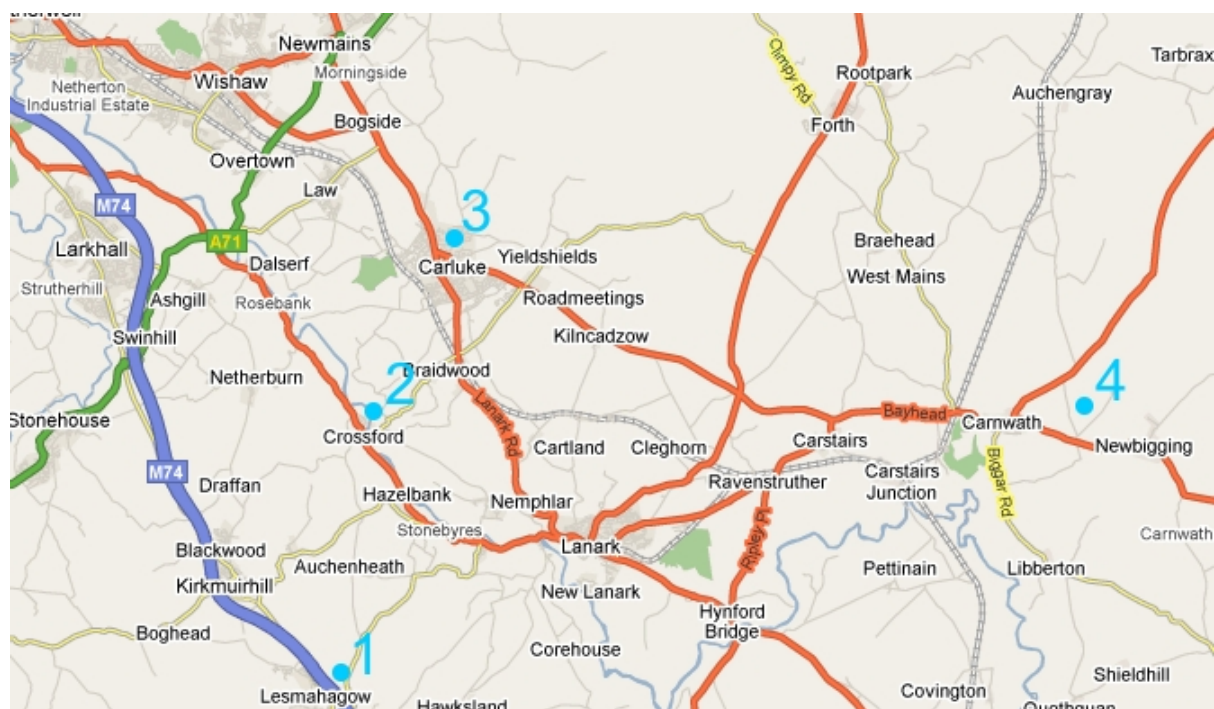
He knew that Greenshields had carved one of Burns for a Tam O'Shanter set circa 1826-27 and that Sir Walter Scott had reported seeing a Burns statue in Greenshields' workshop in January 1829.

On his return to Australia, Mr Ashley tracked down the statue to Camperdown, 119 miles (193km) south west of Melbourne. It was in poor condition, with the hat, face and coat vandalised. The citation reads: "Burns, from an original painting by his friend, Peter Taylor, Edinburgh, 1786. By John Greenshields, sculptor, Edinburgh, 1830. Presented to the public park by W. A. Taylor, Esq. Camperdown, 1883."

William Taylor, who was from Leith, had been bequeathed the Taylor portrait of Burns by the artist's wife on her death. He had shipped the statue to Australia after emigrating there and on his death in 1866 the statue passed to his son W. A. Taylor, who donated it to the town. "The Greenshields statue is unquestionably 'after' the Peter Taylor portrait, down to the hat and the right hand thrust inside the vest," Mr Ashley said. "The implications are immense, for it means that it is the only statue of Burns in the world to have been based on the Taylor portrait."

Michael Russell, the Minister for Culture, told Mr Ashley that the government did not have funds for a restoration project but would help to put him in contact with other organisations that might wish to discuss hosting the statue in Scotland.

APPENDIX 3:
Map of part of South Lanarkshire showing known locations for John Greenshields



1. Lesmahagow: Greenshields' place of birth, 1792
2. Crossford: location of stonemason apprenticeship
3. Milton, near Carluke: location of first workshop, c. 1822
4. Broomhill Farm: possible location of latest workshop